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Authors

Grattan, Rebecca E
Tryon, Valerie L
Carter, Cameron S
et al.

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Suicide behavior is associated with childhood emotion dysregulation but not trait impulsivity in first episode psychosis

Rebecca E. Grattan, **Valerie L. Tryon**, **Cameron S. Carter**, **Tara A. Niendam**[*]

Department of Psychiatry & Behavioral Sciences, University of California-Davis, Sacramento, CA, USA

Abstract

Historically, research on suicide behavior has not included those experiencing first episode psychosis (FEP), hindering prevention efforts for this population. Emotion dysregulation and impulsivity represent two mechanisms that contribute to suicide, but these have not been examined in FEP. We hypothesize that the combination of trait impulsivity and childhood emotion dysregulation are associated with suicide behavior (SB) and ideation (SI) in those experiencing FEP. Participants were recruited from an Early Psychosis Program (N=80, ages 12-32, 65% male). Clinician ratings of symptoms and history of SI and SB were obtained at baseline. Participants also completed self-report measures of childhood emotion dysregulation and trait impulsivity. Regression analyses examined whether childhood emotion dysregulation and trait impulsivity individually or in combination were associated with SI and SB, and the severity of SI and SB. Childhood emotion dysregulation was significantly associated with a history of SB and its severity, but not SI. Attention impulsivity was associated with the severity of SI. However, other impulsivity types, and interactions were not associated with a history of SI or SB. This suggests childhood emotion dysregulation is a potential target for prevention of SB in FEP, while trait impulsivity may be less important in this effort.

Keywords

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[*]**Corresponding author:** Tara A. Niendam, Ph.D., Department of Psychiatry and Behavioral Sciences, University of California, Davis, 4701 X St, Sacramento, CA 95817, (916)734-3090, tniendam@ucdavis.edu.

1. Introduction

Understanding suicidality within psychosis is vital given psychotic experiences are associated with increased rates of suicide, as well as suicide ideation and behavior, that cannot be purely explained by co-morbid difficulties such as depression (Bromet et al., 2017; DeVylder, Lukens, Link, & Lieberman, 2015; Yates et al., 2019). Individuals with psychosis appear to be at the highest risk of suicide behavior during the early stages of illness (Dutta et al., 2010). A recent meta-analysis showed that 18.4% of those with first episode psychosis (FEP) had performed deliberate self-harm, such as suicide attempts or deliberate self-injury, prior to receiving treatment for the first time (Challis, Nielssen, Harris, & Large, 2013). Individuals with psychosis are often excluded from studies on risk factors for suicide ideation and behavior, and so it is currently unclear what specific, versus transdiagnostic, factors might contribute to this risk in FEP.

Emotion dysregulation and impulsivity represent two factors associated with suicide behavior that may be of particular concern to those experiencing FEP (Huddy et al., 2013; Trémeau, 2006). Emotion dysregulation increases in response to daily life stressors for those at risk for psychosis (Grattan & Linscott, 2019), and is associated with impulsivity (Maxfield & Pepper, 2018). The onset of psychosis is a time of increased stress (Beards et al., 2013) and emotional distress appears to be highest at illness onset (Khoury, Lecomte, Comtois, & Nicole, 2015). Given that impulsivity is associated with suicide attempts during states of high affective symptoms (Millner et al., 2018), fluctuations in suicide risk may occur for those with high impulsivity and emotion dysregulation in the early stages of psychosis, explaining why FEP are at greatest risk for suicide behavior (Challis et al., 2013). In addition, it seems likely the combination of emotion dysregulation and impulsivity would be most concerning for FEP who are also experiencing suicide ideation and positive psychosis symptoms (see Figure 1).

Emotion regulation refers to a broad set of processes that influence what emotions one experiences, when one has them and the expression of this emotion (Gross & Jazaieri, 2014). This involves increasing, maintaining and decreasing both negative and positive emotions and is achieved by monitoring, evaluating and modifying the emotions using both conscious and unconscious strategies (Gross, 2002). Emotion dysregulation, as defined here, is poor or unhelpful emotion regulation. At a basic behavioral level this includes: 1) emotion sensitivity (heightened emotional stress reactivity to environmental stimuli), 2) increased negative affect (increased negative mood states such as irritability), and 3) inadequate or maladaptive emotion regulation strategies, common examples include the use of NSSIB or aggression when upset (Carpenter & Trull, 2013). These facets of emotion dysregulation are all associated with suicide behavior in general populations (Liu & Miller, 2014; O'Connor, Green, Ferguson, O'Carroll, & O'Connor, 2017; Pettit, Joiner, & Rudd, 2004; Pisani et al., 2013). Childhood emotion dysregulation also appears to be a particular risk factor for later suicide behavior, with a recent meta-analysis finding that irritability in childhood was predictive of later suicide attempts (Orri, Perret, Turecki, & Geoffroy, 2018).

In psychosis populations, it is apparent that emotion dysregulation is elevated, but it is unclear if emotion dysregulation and suicide behavior are linked. Stress sensitivity is

increased in those at risk for schizophrenia (Grattan et al., 2015). Those experiencing psychosis are less likely to use effective emotion regulation strategies (Van der Meer, Wout, & Aleman, 2009), and negative affect such as reported sadness is higher in psychosis groups than non-patient populations (Livingstone, Harper, & Gillanders, 2009). However, increases in negative affect are the only factor of emotion dysregulation that has been associated with suicide behavior in psychosis populations. Those with established affective psychotic disorders are more likely to die by suicide than individuals with non-affective psychosis, suggesting the additional depression or mania symptoms may raise risk for suicide behavior (Hiroeh, Appleby, Mortensen, & Dunn, 2001). In addition, both hopelessness and depression predict suicide attempts in those experiencing early psychosis, over and above a history of suicide attempts (Klonsky, Kotov, Bakst, Rabinowitz, & Bromet, 2012; McGinty, Haque, & Upthegrove, 2018). However, in those with FEP the relationship between depression and suicide attempts appears to vary (Shrivastava et al., 2016). Thus, depression alone may be inadequate to predict suicide in FEP.

While emotion dysregulation may contribute to suicidality in this population, not all of those reporting dysregulation go on to attempt suicide. Given that emotion dysregulation in young people is often associated with increased impulsivity (Hatkevich, Penner, & Sharp, 2019) and some individuals attempt suicide with minimal ideation or planning (Simon et al., 2001), emotion dysregulation and impulsivity may be important to consider in conjunction when considering suicide risk in FEP. Trait impulsivity scores, such as the Barrett Impulsiveness Scale attention score, are associated with suicide behavior in psychosis populations (Nanda et al., 2016). Impulsivity is thought to facilitate the transition from suicide ideation to suicide behavior (Klonsky & May, 2010; Maxfield & Pepper, 2018), and so this is an important consideration. To our knowledge, no research has yet considered the possible roles of both impulsivity and emotion dysregulation on suicide behavior in FEP populations.

The aims of the present study were to examine whether trait impulsivity and childhood emotion dysregulation are associated with a history of suicide ideation and behavior, occurrence and severity, and whether the interaction between childhood emotion dysregulation and trait impulsivity is associated with a history of suicide ideation and behavior in an FEP population. We hypothesized that the combination of childhood emotion dysregulation and trait impulsivity would be associated with suicide ideation and behavior.

2.   Method

2.1   Participants

We recruited 323 individuals aged 12-35 from the University of California, Davis, Early Diagnosis and Preventive Treatment (EDAPT) Clinic, an outpatient early psychosis clinic, between June 2010 and December 2018 as part of a larger study of cognition in psychotic disorders (5R01MH059883). As psychosis typically presents between ages 15-30 (Jones, 2013), this study used an expanded age range to capture individuals experiencing onset just outside of this typical age window. Participants were assessed with the Structured Clinical Interview for DSM-IV-TR (SCID-IV-TR; (First, Spitzer, Gibbon, & Williams, 2002) to determine eligibility as FEP (onset of psychosis in the past 2 years) and received primary psychotic (schizophrenia, schizoaffective, schizophreniform disorders), psychotic disorder

not otherwise specified (NOS), or mood disorder with psychotic features (bipolar or major depression) diagnoses according to the DSM-IV-TR. Participants were required to speak English fluently, have no history of a diagnosis of substance-induced psychosis, neurological illness, history of head trauma leading to unconsciousness, or WASI IQ below 70 (Stano, 2004). Participants were invited to complete research appointments, and the final analyses were completed on a subset of participants ($N = 80$). Of the 246 participants who were not included, these participants were excluded due to becoming ineligible during the study ($n = 12$), withdrawing from the study ($n = 106$), not completing all of the relevant measures ($n = 57$), or not attending required research appointments ($n = 71$). The included ($n = 80$) and excluded ($n = 243$) participants did not differ by sex at birth, ethnicity, race, diagnosis, age, trait impulsivity or emotion dysregulation. Suicide variables did differ as the excluded sample had a higher proportion of participants with no suicide ideation or behavior ($X^2 = 22.06$, $p < 0.001$). This study was reviewed and approved by the UC Davis Institutional Review Board (protocol #226043).

2.2 Measures

Diagnostic information was collected by clinicians using the SCID-IV. Clinicians had demonstrated good reliability on the SCID-IV (defined by a kappa of at least 0.70 during training). Suicide history (suicide ideation and behavior) was collected by clinicians using the Columbia-Suicide Severity Rating Scale (C-SSRS) (Posner et al., 2011). Suicide data were coded for presence or absence of suicide ideation and behavior as defined in the C-SSRS (Posner et al., 2011). This included any reported suicide ideation (wish to be dead, non-specific active suicide thoughts, active suicide ideation with methods but no intent, active suicide ideation with some intent but no plan, or active suicide ideation with specific plan and intent), and any reported suicide behavior (preparatory behavior, self-interrupted attempt, interrupted attempt, or actual attempt). Highest severity suicide attempt type was defined as (0 = No attempt, 1 = Self-interrupted attempt, 2 = Interrupted attempt, 3 = Actual attempt) and highest severity suicide ideation type was defined as (0 = No ideation, 1 = Wish to be dead, 2 = Non-specific active suicide thoughts, 3 = Active suicide ideation with methods but no intent, 4 = Active suicide ideation with some intent but no plan, 5 = Active suicide ideation with specific plan and intent). Clinicians were trained to reliability with a kappa of at least 0.80 on the C-SSRS. Measures of symptoms were also captured at baseline by clinicians using the Scale for the Assessment of Positive Symptoms (SAPS) (Andreasen, 1984), the Scale for the Assessment of Negative Symptoms (SANS) (Andreasen, 1981) and the Brief Psychiatric Rating Scale (BPRS) (Lukoff, Nuechterlein, & Ventura, 1986). Consistent with previous research, symptoms from the BPRS, SANS and SAPS were summarized into 3 factor scores: reality distortion, disorganization, and poverty symptoms (Barch, Carter, MacDonald III, Braver, & Cohen, 2003). The depression item from the BPRS (range: 1 = not present to 7 = extremely severe) was used to capture depressed mood symptoms. This was used instead of the BPRS affect factor score (Shafer, Dazzi, & Ventura, 2017) to avoid confounding relationships with suicide variables. Clinicians had demonstrated reliability on the SAPS, SANS, BPRS as defined by an intraclass correlation coefficient of at least 0.7.

Emotion dysregulation and impulsivity were measured using self-report questionnaires. Emotion dysregulation was measured using retrospective reports of childhood emotion dysregulation on the Wender Utah Rating Scale (Rossini & O'Connor, 1995), which asked participants to rate their behavior up to age 12. This scale is commonly used to identify a history of attention deficit hyperactivity disorder symptoms in populations experiencing psychosis (Boutros et al., 2002; Salo et al., 2013; Tamam, Karakus, & Ozpoyraz, 2008). Items related to emotionally dysregulated behavior were selected to create a sub-score including: "had a hot or short temper, low boiling point", "had temper outbursts, tantrums", "was irritable", "was moody, had ups and downs", "was angry", "lost control of myself' and "tended to be or act irrational". These items had excellent inter-reliability (a = 0.909), and removal of any item reduced the inter-reliability. Items could be rated 0 - 4, with higher scores indicating higher frequency, and were summed to give an emotion dysregulation score. Impulsivity was measured using the Barratt Impulsiveness Scale, which measures stable impulsivity traits. Attention impulsivity (poor focus on current tasks and intrusive thoughts), motor impulsivity (acting quickly and unstable lifestyle) and non-planning impulsivity (not enjoying mental challenges or thinking deliberatively) scores were used, as defined in the BIS-11 factor structure (Reise, Moore, Sabb, Brown, & London, 2013). Childhood emotion dysregulation was selected given evidence it is a particular risk factor for later suicide behavior (Orri et al., 2018), and compared to trait impulsivity (characteristic impulsivity that is consistent across development). Demographics were collected using self-report questionnaire.

2.3 Statistical Analysis

Demographic variables were compared across those with a history of suicide ideation only, those with a history of suicide behavior, and those without a history of ideation or behavior, using chi-square and ANOVA. Relationships between childhood emotion dysregulation, trait impulsivity and symptoms were compared using Pearson correlations and relationships between psychosis symptoms and suicide ideation, and behavior were examined using hierarchical binomial regressions. These data are presented in the supplementary material.

Hierarchical binomial logistic regressions were performed to understand contributions of childhood emotion dysregulation and trait impulsivity, and their interaction, to suicide behavior and ideation (coded as presence or absence of a history of suicide ideation or behavior) in a FEP population. Ordinal regression then compared childhood emotion dysregulation and trait impulsivity scores across severity of suicide attempts and ideation, to see if the effects differed by severity. Main effects were considered, followed by the addition of interaction terms and then control variables (depression, positive psychosis symptoms, negative psychosis symptoms and disorganized psychosis symptoms). Psychosis symptoms and depression were selected as control factors given they are both associated with suicide (Kelleher et al., 2013; Upthegrove et al., 2010), in order to understand the unique contribution of emotion dysregulation and impulsivity. Interaction terms and control variables were added individually so models were not overconstrained. Demographic variables were removed from the analyses as there were no differences across groups. Given the majority of those experiencing suicide behavior or suicide attempts also have experienced ideation, behavior analyses also controlled for suicide ideation. All statistical

analyses were performed using SPSS version 23 and, given a prior hypotheses, p < 0.05 was used to determine significance. Data met assumptions of normality, linearity, homoscedasticity and multicollinearity as appropriate. Models had sufficient power as determined by the >15 participant to predictor rule (Stevens, 2012).

3. Results

Demographics for the total sample (N=80) are displayed in Table 1; 45% of participants reported a history of suicide ideation only, 31.35% reported a history of suicide ideation and behavior, 2.50% reported a history of suicide behavior only, and 21.25% reported no history of suicide ideation or behavior. Of those reporting a history of suicide behavior (n = 27), 51.80% reported actual attempts.

When comparing those with a history of suicide ideation only, those with a history of suicide behavior and those with no history of either, preliminary results suggest there was no difference in diagnosis (X^2= 3.57, p = 0.47), sex (X^2= 1.50, p = 0.47), ethnicity (X^2= 1.95, p = 0.38), race (X^2= 6.74, p = 0.57) or age (F = 0.68, p = 0.51). Suicide ideation was significantly related to suicide behavior (X^2= 4.726, p = 0.03).

Multiple binary logistic regression examined whether childhood emotion dysregulation, attention impulsivity, motor impulsivity and planning impulsivity (and the interactions between emotion regulation and the impulsivity variables) were associated with suicide ideation or suicide behavior, controlling for depression and positive, negative and disorganized psychosis symptoms. As shown in Table 2, none of these factors were significantly associated with suicide ideation. Addition of the interaction terms and control variables did not improve the model. In terms of predicting suicide behavior, childhood emotion dysregulation was the only variable that was significantly associated with suicide behavior (Figure 2). Those reporting a one-point increase in childhood emotion dysregulation were at 1.15 greater odds of having a history of suicide behavior (p < 0.01). Addition of the interaction terms and control variables did not improve the model.

Ordinal regression examined whether childhood emotion dysregulation, attention impulsivity, motor impulsivity and planning impulsivity (and the interactions between emotion regulation and the impulsivity variables) were associated with the highest severity of suicide ideation and attempts reported, controlling for depression and positive, negative and disorganized psychosis symptoms. As shown in Table 3, attention impulsivity was associated with severity of ideation, with those reporting a one-point increase in attention impulsivity at 1.18 times greater odds of having a history of a more severe type of ideation, (p = 0.02). Childhood emotion dysregulation and other impulsivity types were not associated with severity of ideation. Addition of the interaction terms and control variables other than depression and positive psychosis symptoms did not improve the model. However, those reporting a one-point increase in depression had 1.50 times greater odds of having a history of a more severe type of ideation (p < 0.01), and those reporting a one-point increase in positive psychosis symptoms had 1.07 times greater odds of having a history of a more severe type of ideation (p < 0.05). In terms of predicting suicide attempt severity, childhood emotion dysregulation was significantly associated with attempt severity (Figure 3). Those

reporting a one-point increase in childhood emotion dysregulation were at 1.19 times greater odds of having a history of a more severe type of attempt ($p < 0.001$). Trait impulsivity was not associated with attempt type. Addition of the interaction terms and control variables did not improve the model.

4. Discussion

Associations between possible risk factors (trait impulsivity and childhood emotion dysregulation) and suicide factors (ideation and behavior) were examined in FEP individuals. While attention impulsivity was associated with suicide ideation severity, childhood emotion dysregulation, other impulsivity traits and their interactions were not associated with suicide ideation or suicide ideation severity. Severity of suicide ideation was also associated with depression and positive psychosis symptoms. As hypothesized, childhood emotion dysregulation was associated with suicide behavior and suicide behavior severity, but impulsivity traits and the interaction between childhood emotion dysregulation and trait impulsivity were not. This indicates that attention impulsivity traits are associated with historical suicide ideation severity, and childhood emotion dysregulation is associated with a history of suicide behavior and suicide behavior severity, beyond the effect of depression and psychosis symptoms in FEP.

Interestingly, while no factors were associated with a history of suicide ideation, attention impulsivity, positive psychosis symptoms and depression were all associated with the severity of historical suicide ideation. This supports previous findings in the general population that impulsivity is related to suicide ideation (Conner, Meldrum, Weiczorek, Duberstein, & Welte, 2004), and findings that ideation is associated with depressed mood and negative beliefs about self in those experiencing psychosis (Fialko et al., 2006). This indicates that for FEP, attention impulsivity traits, positive symptoms and depression may contribute to the severity of suicide ideation, but not whether or not ideation will occur. This also highlights that the type of impulsivity is important to consider when thinking about suicide ideation. Attention impulsivity primarily relates to concentration and the ability to manage ones thoughts. Thus, it seems logical that people with FEP who have difficulty managing their thoughts might be less able to reduce negative thoughts such as suicide ideation. Childhood emotion dysregulation was not associated with suicide ideation or ideation severity in this FEP population, in contrast to past findings that affect reactivity is associated with ideation in Clinical High Risk populations (Palmier-Claus, Taylor, Gooding, Dunn, & Lewis, 2012). This was also contrary to the finding that poor control over emotional reactions was associated with suicide ideation but not behavior in adolescent inpatients (Auerbach, Stewart, & Johnson, 2017). It seems possible current emotion dysregulation impacts suicide ideation, rather than the presence of emotion dysregulation in childhood.

To our knowledge, this is the first study to find an association between childhood emotion dysregulation and suicide behavior in a FEP population. This supports previous findings that individuals with schizophrenia who experience less emotional blunting (e.g., emotional withdrawal) are more likely to report suicide behavior (Tarrier et al., 2007), and findings in the general population that childhood irritability is associate with later suicide behavior (Orri

et al., 2018). It also supports findings in adolescent psychiatric populations that emotion dysregulation is higher in those who report a history of suicide attempts (Zlotnick, Donaldson, Spirito, & Pearlstein, 1997). Together this information suggests that childhood emotion dysregulation may play a role in suicide behavior in FEP, as seen in other psychiatric populations and the general population, supporting the concept that emotion dysregulation may be a transdiagnostic factor that contributes to suicide behavior.

Unexpectedly, impulsivity traits were not associated with suicide behavior, independently or by interacting with childhood emotion dysregulation in those with FEP. This is contrary to past research that found an association between impulsivity traits and suicide behavior in patients with psychosis (Nanda et al., 2016). Nanda and colleagues reported that impulsivity was higher in schizoaffective disorder and psychotic bipolar disorder groups than those with schizophrenia. This suggests that for those with established affective psychotic disorders, impulsivity may contribute to suicide behavior, whereas for those with FEP it may be less important. The present finding is also contrary to findings in other clinical populations, such as those with depression. In those experiencing depression, individuals with impulsive traits are more likely to report suicide attempts (Chaudhury et al., 2016). It seems possible that impulsivity is related to suicide behavior in other populations, but those with early psychosis may attempt suicide due to other reasons such as emotion dysregulation or positive psychosis symptoms. Given impulsivity and emotion dysregulation did not interact in this sample to predict suicide ideation or behavior, this indicates consideration of impulsivity also does not add additional value over considering emotion dysregulation when predicting suicide behavior for those with FEP. Emotion dysregulation may be more impactful for FEP than impulsivity given dysregulation exacerbates psychosis symptoms (Docherty, St-Hilaire, Aakre, & Seghers, 2009). Alternatively, the type of impulsivity measured may be important. While this study measured cognitive trait impulsivity, research indicates negative urgency (the tendency to act impulsively when distressed) is the strongest predictor of suicide behavior (Millner et al., 2018). In addition, impulsivity in relation to suicide behavior may be better accounted for by emotional reactivity, rather than acting impulsively in general, as suggested by Auerbach et al. (2017).

These findings should be considered within the context of methodological limitations. Given the sample size, effect sizes were small; therefore, future studies in larger populations will help determine the extent of these findings. This study used retrospective measures of suicide ideation and behavior, thus it is unclear whether childhood emotion dysregulation and trait impulsivity predict future suicide ideation and behavior in FEP. To further explore these ideas, longitudinal examinations of the relationship between emotion dysregulation, impulsivity and suicide behavior would add to suicide behavior prevention efforts. It would also be interesting to understand how these factors may impact the frequency of suicide behavior. Further, the present measure of emotion dysregulation is best conceptualized as retrospective reports of high childhood reactivity. It does not measure the two other aspects of emotion dysregulation: coping strategies and sensitivity to stressors (Livingstone et al., 2009), and it does not measure current emotion dysregulation. The longevity and consistency of emotion regulation over time is currently unclear, and so it is not known if the present measure would also estimate current emotion dysregulation. Retrospective reporting of negative emotions can also be subject to bias (Sato & Kawahara, 2011). Future research

should consider all aspects of emotion dysregulation (both current and historical) to build an understanding of how best to treat emotion dysregulation. As discussed, the current measure of impulsivity was a measure of trait impulsivity. Future research could include additional measures of impulsivity, such as negative urgency, to expand our understanding of impulsivity for FEP. Emotion dysregulation and impulsivity were also measured using self-report measures. Though these are very well validated in the literature (Reise et al., 2013; Rossini & O'Connor, 1995), it would be useful to understand if clinician rated measures behaved in the same way. While we used a clinician rated measure of depression in this study, alternate measures of depression (e.g. Calgary Depression scale) may have provided more detailed information related to depression symptoms in psychosis. In addition, there are other possible factors that may contribute to suicide in FEP that were not examined here, such as substance use (Robinson et al., 2010), that would be relevant for future research.

Understanding factors contributing to suicide behavior in FEP populations is vital to develop clear treatment targets. Current prevention of suicide behavior in clinical care focuses on assessing current and historical suicide factors and safety plan development (Stanley & Brown, 2012), and often does not differ depending on co-morbidities (Zalsman et al., 2016). Considering symptom-specific risk factors may improve suicide behavior prevention. Importantly, given a childhood measure of emotion dysregulation was used, this indicates that early intervention for young people demonstrating symptoms of emotion dysregulation may be useful for reducing risk of future suicide behavior. Factors such as emotion dysregulation could be directly targeted by psychological interventions such as dialectical behavior therapy techniques (Zalsman et al., 2016) to reduce suicide risk. Our findings indicate that targeting impulsivity traits with treatment may improve suicide ideation severity but may be less helpful when considering suicide behavior.

In conclusion, childhood emotion dysregulation, but not trait impulsivity is associated with a history of suicide behavior in those experiencing FEP. Suicide ideation in FEP is associated with attention impulsivity traits, positive psychosis symptoms and depression scores. Future research directions include longitudinal analyses of impulsivity, emotion dysregulation and suicide behavior in psychosis populations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

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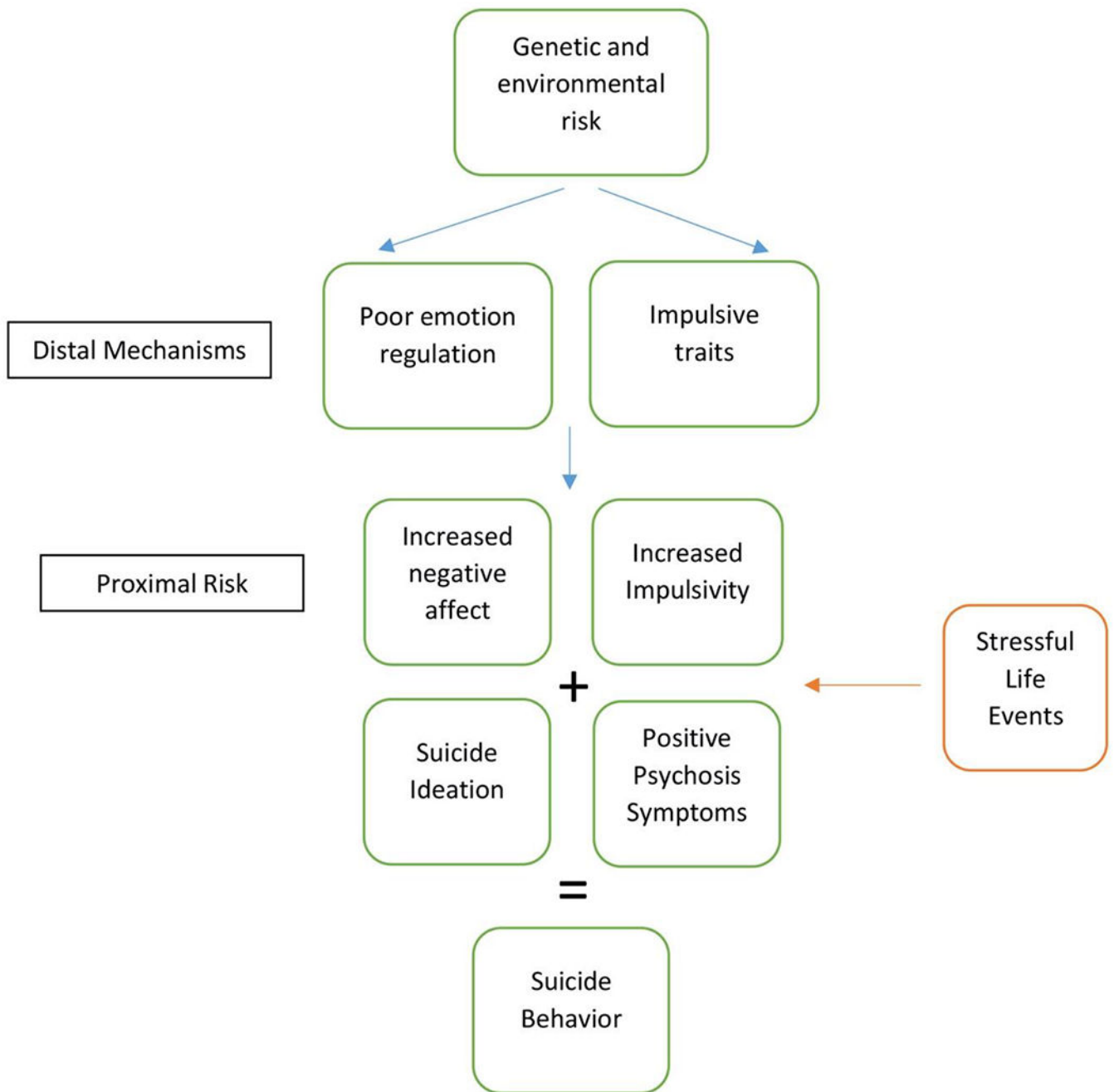
Highlights

- Childhood emotion dysregulation is associated with suicide behavior in first episode psychosis

- Attention impulsivity traits are associated with suicide ideation in first episode psychosis

- Children with emotion dysregulation may be a population to target with suicide prevention efforts
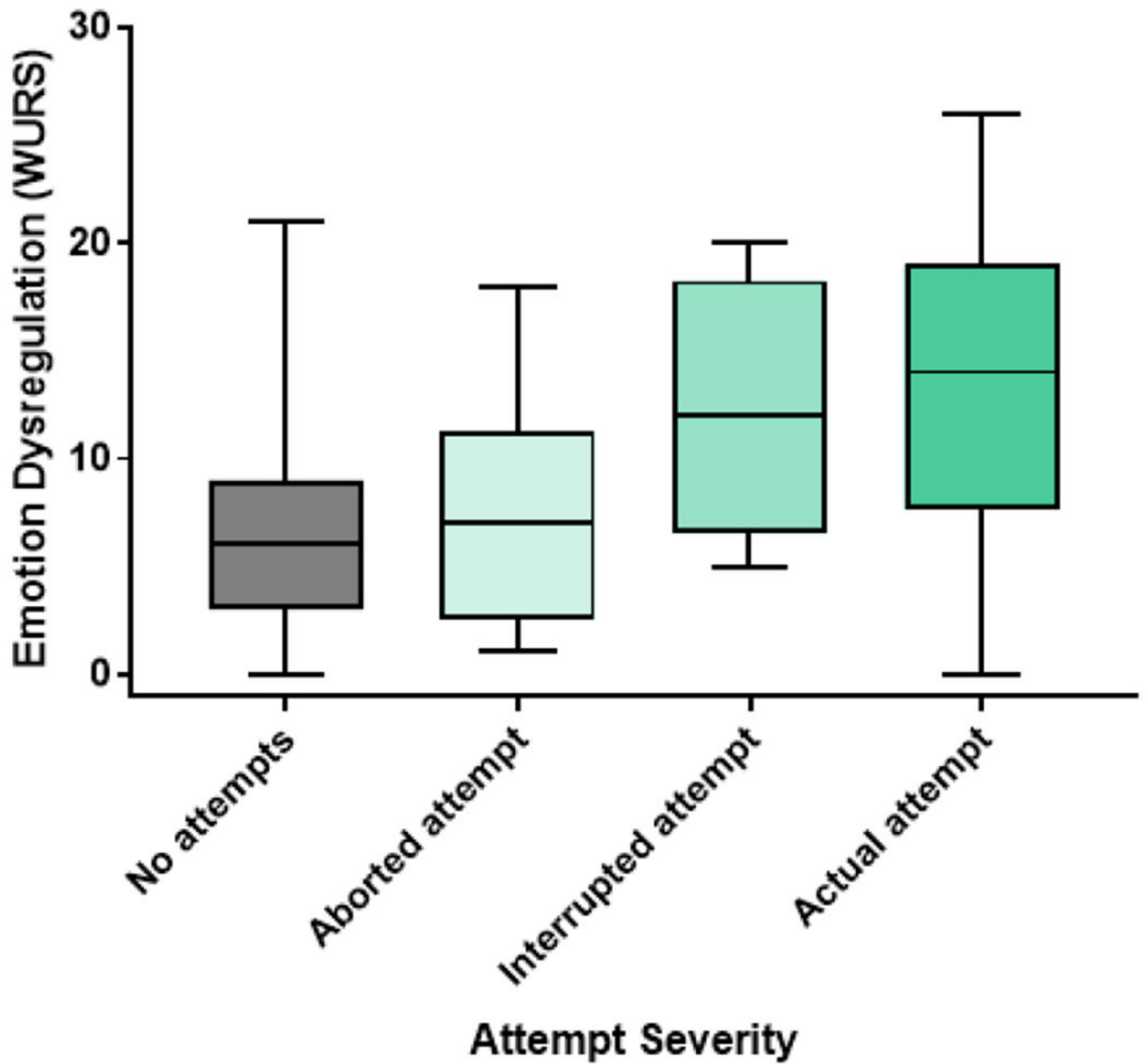
Figure 1.
Model of the contributions of impulsivity and emotion dysregulation to suicide behavior in first episode psychosis.
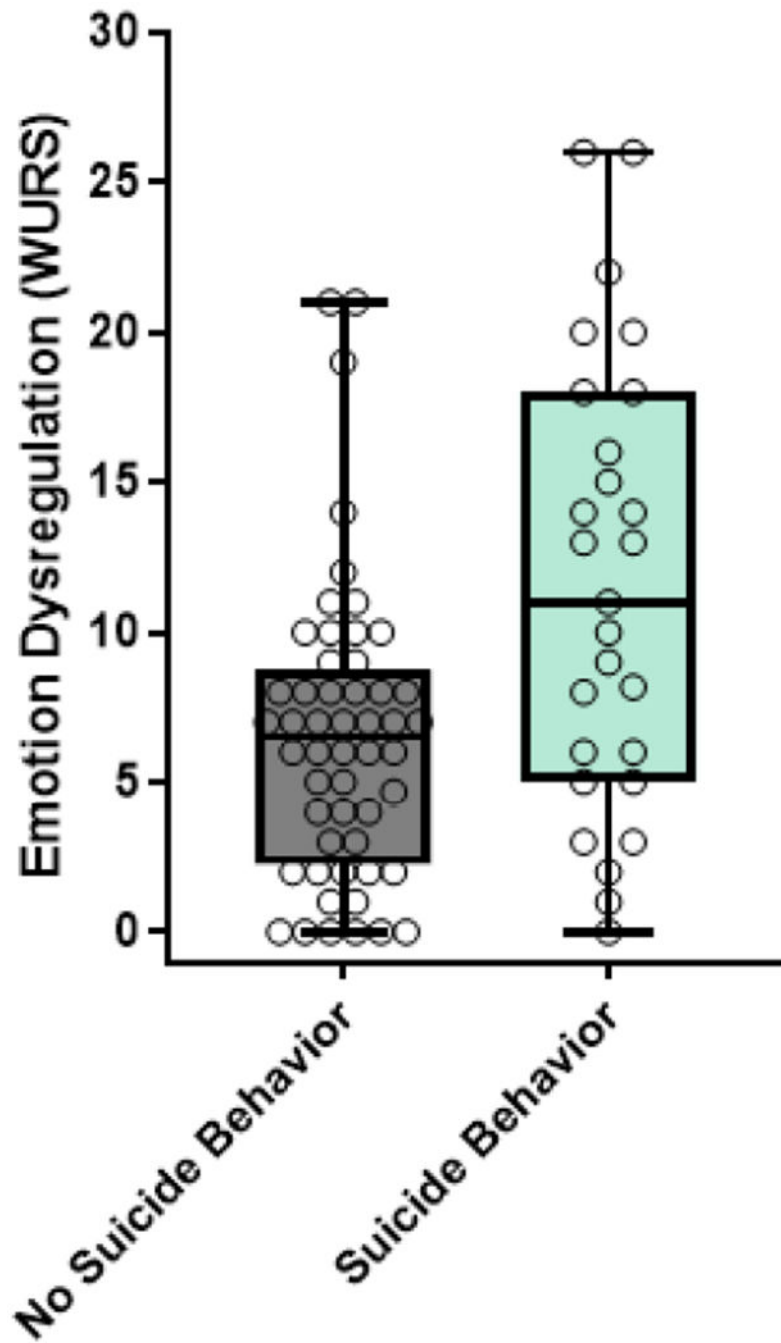
Figure 2.
Those who reported suicide behavior also reported higher childhood emotion dysregulation

Figure 3.
Childhood emotion dysregulation scores significantly differ depending on severity of reported suicide attempt.

Table 1

Demographics characteristics of the subsample N = 80

		Suicide Ideation only (N = 36)	Suicide behavior (N = 27, 25 with ideation)	No suicide behavior or ideation (N = 17)
		N (%)		
Sex	Male	22 (61.1%)	20 (74.1%)	10 (58.8%)
Race	Caucasian	26 (72.2%)	13 (48.1%)	11 (64.7%)
	African American	4 (11.1%)	6 (22.2%)	1 (5.9%)
	Asian	4 (11.1%)	4 (14.8%)	3 (17.6%)
	Pacific Islander	1 (2.8%)	1 (3.7%)	0 (0.0%)
	More than one race	1 (2.8%)	3 (11.1%)	2 (11.8%)
Ethnicity	Hispanic	10 (27.8%)	5 (18.5%)	2 (11.8%)
DSM-IV	Schizophrenia Spectrum	25 (69.4%)	16 (59.3%)	10 (58.8%)
Diagnosis	Mood with Psychotic Features	8 (22.2%)	8 (29.6%)	7 (41.2%)
	Psychotic Disorder NOS[^]	3 (8.3%)	3 (11.1%)	0 (0.0%)
		Mean (SD)		
Age	Years	19.78(4.21)	19.04 (4.26)	20.53 (4.00)

[^]Not otherwise specified

Table 2

Binary logistic regression results for models predicting suicide ideation and behavior

	Suicide Ideation			Suicide Behavior		
	B	Odds Ratio	95% CI	B	Odds Ratio	95% CI
Emotion Dysregulation	0.09	1.09	0.97±1.22	**0.14**[**]	**1.15**	**1.05±1.27**
Attention Impulsivity	0.15	1.16	0.95±1.43	0.06	1.06	0.90±1.25
Motor Impulsivity	0.03	1.03	0.88±1.21	−0.09	0.92	0.78±1.07
Non Planning Impulsivity	0.01	1.01	0.89±1.15	0.03	1.03	0.92±1.16
Attention Impulsivity by Emotion Dysregulation	0.01	1.01	0.97±1.04	0.01	1.01	1.03±0.99
Motor Impulsivity by Emotion Dysregulation	0.02	1.02	0.98±1.05	0.01	1.01	1.03±0.99
Non Planning Impulsivity by Emotion Dysregulation	<0.01	1.00	0.98±1.03	0.01	1.01	1.04±0.99

[*]
$p < 0.05$,

[**]
$p < 0.01$,

[***]
$p < 0.001$

Table 3

Ordinal regression results for models predicting highest severity suicide ideation and behavior severity

	Most severe suicide ideation			Most severe suicide behavior		
	B	**Odds Ratio**	**95% CI**	**B**	**Odds Ratio**	**95% CI**
Emotion Dysregulation	0.07	1.07	1.00±1.15	**0.17**[***]	**1.19**	**1.09±1.31**
Attention Impulsivity	**0.17**[**]	**1.18**	**1.03±1.36**	0.03	1.03	0.87±1.21
Motor Impulsivity	−0.11	0.90	0.80±1.01	−0.13	0.88	0.75±1.03
Non Planning Impulsivity	−0.02	0.98	0.89±1.07	0.05	1.05	0.94±1.18
Attention Impulsivity by Emotion Dysregulation	0.01	1.01	0.99±1.03	0.01	1.00	0.98±1.02
Motor Impulsivity by Emotion Dysregulation	−0.01	0.10	0.99±1.02	0.01	1.00	0.98±1.03
Non Planning Impulsivity by Emotion Dysregulation	0.01	1.01	0.99±1.02	0.02	1.02	1.00±1.04

[*]
$p < 0.05$,

[**]
$p < 0.01$,

[***]
$p < 0.001$